COMMONLY USED FORMULAS

LOAD PLANNING

Volume in cubic feet from dimension in inches: $\frac{\text{length x width x height}}{1728}$

ROAD MOVEMENT CALCULATIONS

Distance = Rate x Time

Rate = $\frac{\text{Distance}}{\text{Time}}$ **(round up)**

Time = $\frac{\text{Distance}}{\text{Rate}}$ **(round up)**

Time Distance = $\frac{\text{Distance (miles) x 60}}{\text{Rate (MPH)}}$ = Time (minutes)

Density = $\frac{\text{1760 yards (1 mile)}}{\text{Vehicle gap in yards + average vehicle length in yards}}$ **(round)**

Converting from inches to yards = divide by 36 (36 inches in a yard) **(round up)**

Pass Time (without a time gap) = $\frac{\text{Number of vehicles x 60}}{\text{Density x Rate}}$ = Pass Time (in minutes) **(round up)**

Pass Time (with a time gap) = $\frac{\text{Number of vehicles x 60}}{\text{Density x Rate}}$ + Time Gap = Pass Time (in minutes) **(round up)**

PERCENTAGE FOR AXLE WEIGHT DISTRIBUTION

Number of Axles per vehicle	Type of Vehicle	AXLE 1	AXLE 2	AXLE 3	AXLE 4	AXLE 5	AXLE 6
3	1 ¼ TON	**.38**	**.31**	**.31**			
	2 ½ TON	**.32**	**.34**	**.34**			
	5 TON	**.26**	**.38**	**.38**			
	10 TON	**.24**	**.38**	**.38**			
5	SEMITRAILER	**.14**	**.21**	**.21**	**.22**	**.22**	
6	SEMITRAILER	**.08**	**.22**	**.22**	**.16**	**.16**	**.16**

PREPARATION OF UNIT SUPPLIES FOR AIR MOVEMENT

Weight and Balance Formula = $\frac{(D1 \times W1) + (D2 \times W2) + (D3 \times W3) \text{ etc}}{\text{Gross Weight}}$ = C/B from RDL in inches

D = Distance from Reference Datum Line (RDL) to Axle 1, 2, 3 etc
W = Weight of Axle 1, 2, 3 etc
Gross Weight = Sum of W1, W2, W3 etc (sum of all axle weights)
Note: Compute C/B to nearest whole inch

AIR MOVEMENT OF CARGO AND CARGO RESTRAINT

Restraint Formula = $\frac{\text{Restraint Criteria (G)} \times \text{Weight of Item}}{\text{Approximate restraint obtained}}$ = Number of tiedowns required

RESTRAINT CRITERIA	X	WEIGHT OF ITEM	=	REQUIRED RESTRAINT	÷	APPROXIMATE RESTRAINT OBTAINED	=	# OF TIEDOWNS REQUIRED

RESTRAINT CRITERIA

FORWARD	3.0
AFT	1.5
**LATERAL	1.5**
**VERTICAL	1.5**

IN GENERAL, PROPER APPLICATION OF FORWARD AND AFT RESTRAINT WILL SATISFY LATERAL AND VERTICAL RESTRAINT

APPROXIMATE RESTRAINT OBTAINED:

MB-1 APPLIED AT A 30 X 30 ANGLE = 7500
MB-1 APPLIED AT A 45 X 45 ANGLE = 5000

MB-2 APPLIED AT A 30 X 30 ANGLE = 18750
MB-2 APPLIED AT A 45 X 45 ANGLE = 12500

RESTRAINT EQUIPMENT:

CHAINS AND DEVICES:
MB-1 = 10,000 LBS
MB-2 = 25,000 LBS

STRAPS:
CGU-1/B = 5,000LBS